petent supervision, they become medical advisers to certain patients. Each man or woman of the class is introduced to someone who has come seeking relief, and is told that that suffering human being is his or her patient; so long as they both are attending the dispensary, the student is to be responsible for the patient's care, and is to be the sick person's medical adviser. He is to meet his patient by appointment, he is to examine and record his findings and check them up under the direction of the visiting physician, who is also an instructor of students. This physician decides on the need for consultation, and the student accompanies the patient to the clinics indicated, and records opinions and findings of the consultant clinic on the patient's record; he also gets from the various physicians who see the patient assignments of reading pertinent to the consideration of the case, and of these he must record salient summaries in the record, and on the total records of this year, his standing as a student is rated. No matter to which of the many dispensary clinics the patient's ills take him, the student follows him there; if he goes into the hospital, there, too, the fourth-year student goes. If there is reason to suspect that economic stress, or bad home conditions are contributing to the individual's ill health, the student goes to the home, investigates and reports to his chief, so whatever means of relief are needed, the young man can learn what these are and how best they can be applied. In a way, the idea makes a return to the old apprentice system, but with an improvement: the student is apprenticed to the clinic, and he learns there that clinical medicine exists for the benefit of these suffering human beings we call patients, and that, after all, the science of chemistry, physics, and biology serve the art, while the laboratories are the shops in which medicine forges the weapons that she needs for her ceaseless combat with the forces of destruction and death.

THE FIFTH OR HOSPITAL YEAR

At the end of the four years of such training, the young aspirant to a place in the ranks of the medical profession has to spend another year in training as a resident pupil in a hospital, for all authorities are now one in the conviction that an intern year spent in a hospital of the first rank is essential, not only for the benefit of the pupil, but as well, for the protection of the community. This increased experience, this greater sense of responsibility coming after the long novitiate should guarantee that the profession is recruited in a way that insures not only technical efficiency and intellectual power, but also high character in those who are to renew its life and to maintain its traditions.

Whether these individuals turn to the practice of medicine and surgery, or whether they return to the laboratory for a life devoted to investigation, after such a training they should have acquired a philosophy of life which will bring them to consider that no man can find a more exalted calling than that which has for its aim helping human beings adjust themselves effectively and comfortably to the world in which they needs must exist; a philosophy which will endorse the sentiment expressed by one of medicine's greatest foster sons, Louis Pasteur, when he wrote:

" . . . Nothing is more agreeable to a man who has made science his career than to increase the number of his discoveries; but his cup of joy is full when the result of his observations is put into immediate practical use. . . . "

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INDUSTRIAL DENTISTRY*

ITS TREND—INCLUDING SOME OBSERVATIONS ON EUROPEAN PRACTICE

By GUY MILLBERRY, D. D. S.
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INDUSTRIAL dentistry in some form or other has been in existence for more than a quarter of a century. The first dispensary of which we have knowledge was established in Rio de Janeiro in 1900 in a soap, candle and glycerin factory, where three hundred employees are now engaged. It has been in existence ever since. Free service has always been rendered there, and no deduction in wages is made for time spent in receiving dental treatment.

In the United States the introduction of this form of health service was practically coincident with the war, when the problem of efficient labor was a matter of grave concern because the majority of the employed persons were to a greater or less degree disabled. Statistics show that over 20 per cent of the drafted men were rejected for dental defects.

At the Seventh International Dental Congress, held in Philadelphia in August, 1926, interesting data were presented on this question. Dr. E. L. Pettibone of Cleveland, Ohio, reported that, in so far as the information was obtainable, ninety-one concerns in the United States and Canada maintained dental dispensaries. A resolution was passed at this Congress to the effect that "Public dental care forms the continuation of dental care in the school and must be supplied by sick funds, hospitals, factories, the Army and Navy, and the like. It forms an integral part of the public health service in all countries."

There seems to be no definite trend toward establishing dental clinics in any particular field, for they are to be found in all types of industry, as in cash register factories, department stores, and Babson's service.

AMERICAN DENTAL CLINICS

Industrial dental clinics were available in 1926 in the United States to more than 400,000 employees, and dental service was rendered by 164 dentists, 42 dental hygienists, 100 nurses, and 57 clerks. Two-thirds of all these dental dispensaries were an adjunct to or placed under the direction of the medical dispensary. This is as it should be because it is a part of a general health service, and a single administration is sufficient.

Massachusetts, New York, Pennsylvania, and

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Ohio are the states where industrial dental service has been developed to the highest degree, probably because industrial development in all lines has progressed farther in those states. California has had but a sporadic interest in the problem. The California Raisin Growers' Association and the California Citrus Fruit Growers' Association have maintained clinics for a number of years. The Emporium, in San Francisco, the Oakland Mazda Lamp Company, the Southern Pacific Company, and the Paraffine Paint Company have maintained dental clinics also. There has been no active development here, however, chiefly because the dental profession has not taken the problem up with the executives of plants or concerns where a large number of persons are employed.

Some trade-unions in America have established dental clinics, but these are more commonly found in the East where foreign labor is employed, and the plan seems to be a modification of the European insurance system. This similarity is especially noticeable in New York, where the garment workers' unions employ their own dentist. A good many men look upon industrial dentistry as a disguised form of health insurance.

EMPLOYERS' VIEWPOINT

Not infrequently employees rise to become managers of departments or plants, or become employers of labor themselves, hence any form of service that will reach employees and prove to be beneficial to them is likely to be favored by those who have risen. Generally the man in the office has had more and better dental service than the man in the shop, although his economic status may not be better; from the standpoint of need, then, the man in the shop will require more of the attention of the company dentist.

Employers of labor are usually well informed regarding the need for and the value of good dental service. When consideration of this kind is asked by their own dentists, they have investigated and frequently inaugurated a dental health service for employees, especially in companies where some form of medical service already exists. Many of the industrial dental dispensaries in America have started in this way, though the dentists who promulgated the thought or plan had no personal ambitions to gratify.

The industrial dentist is not concerned with conditions under which men work, such as ventilation, illumination, sanitation, safety devices, and so forth; neither is he concerned with tours of inspection through the plant.

In part, the fundamental principles of industrial medicine, such as preventive, curative and educational procedures, apply equally to industrial dentistry. The health hazards of various manufacturing processes, the problem of poisonous gases, fumes and dust, physical examination, the correction of remediable defects, which cause minor disabilities and absence from work, are the concern of both dental and medical service.

Work in a candy factory is reported to be very detrimental to the teeth, yet sugar is a nonpoisonous substance. The abolition of the use of yellow phosphorus in match factories eliminated a very prevalent and serious disease known as "phossy jaw."

CHARACTER OF SERVICE—CURATIVE AND PREVENTIVE

What character and what volume of dental service shall be rendered? One hundred per cent of all people above the age of three years need some dental service, and they would be much better off if they received such service at least twice a year.

In most industrial dispensaries, however, the custom continues of rendering emergency service for the relief of pain and for the elimination of infection which may cause a disability. This is largely the heritage left to industrial medical and dental clinics by the "mine doctor" and "camp doctor" of former days.

Examinations of the mouth and teeth in more progressive plants are now made concurrently with the general medical examination of new employees and periodic reëxamination of old employees is frequently practiced.

An inquiry into the customary procedure in American industrial dental clinics elicited the information from more than 50 per cent of the correspondents that prophylaxis produced the best results both as to its influence on the health of the oral cavity and also as to its psychological effect upon the employees. This type of service has the effect of stimulating the demand for other types of service.

While esthetics plays no part in the problem of industrial dentistry, especially among plant workmen, service which aids in the improvement of health and efficiency and produces a better spirit of coöperation and good will among the employees is looked upon favorably by executives.

EDUCATION OF EMPLOYEES

Education of the employees in the need for and the value of good dental service is important. This is customarily carried on by means of pamphlets or articles published in the house organ. Well written, well illustrated information finds its way into the home through the worker. Such ideas and recommendations are much more likely to be followed in homes where economic conditions make the prevention of disease a possibility.

Education in the prevention of dental disorders is especially valuable for children, and in employments where the industrial worker's child grows up in the service of the company which employs his father it is advisable to carry this education to the children wherever possible. The Colorado Fuel and Iron Company at Pueblo, Colorado, have carried on an excellent educational service for children, employing a dental hygienist whose chief duty is to educate and care for the children.

Dr. Ellen Stadtmuller, in discussing children's care recently, stated, "When teeth are decaying and uncared for we have a center of infection which may exert its influence on the body generally." Clinical experience in dentistry supports this view.

RELATION OF TIME LOSS TO MEDICAL COST

Figures such as were given me a few years ago by the medical director of the National Cash Register Company will indicate to an executive

that the saving in lost time, which in this case amounted to $27,000 a year is well worth while. He stated that the joint medical and dental service was able to save an average of forty hours a year for each of five thousand employees, whose average wage was fifty cents per hour, which totaled $100,000. The cost of this service was $73,000 dollars. He stated further that the medical and dental dispensaries are looked upon as a part of the plant, just as much as the sales or shipping or manufacturing departments are.

Another element of cost which is deserving of consideration is transportation and hospitalization of ambulatory cases, where local service with a reasonably short trip will accomplish equally good results. Thus one company, operating extensively in several states, finds it advisable and satisfactory to arrange for dental service in certain centers rather than transport patients long distances and hospitalize them at a central point, with a greater loss of time.

In some instances overenthusiastic individuals have expanded the dental service until it became top-heavy and collapsed of its own weight. It is difficult to reinstate such a service. It is also unwise to employ any considerable amount of clerical assistance in an effort to prove a theory in connection with the economic value of dental service.

EUROPEAN INSURANCE PLAN

The European situation is somewhat different. There the insurance plan prevails generally. It is especially true in Germany, where every person employed must be insured and in England, where the Health and Unemployment Insurance Act is very generally applied.

In Germany, with a population of sixty-five millions, eleven dental dispensaries are maintained for workers. In New York, with ten million people, fourteen or more dispensaries are in operation; in Ohio there are sixteen; in Pennsylvania, seventeen; and in Massachusetts, nineteen dispensaries.

In England between thirteen and fourteen million people belong to approved societies, which avail themselves of the benefits of the Health Insurance Act. A great many of the approved societies use their surplus funds to pay in part for additional dental benefits, the patient paying the difference in cost. It has been estimated that $50,000,000 annually will be available for about fifteen million people in 1930, and that 50 per cent of them may avail themselves of this service. All of these people are compulsory contributors to the plan, but many will not use it.

I visited some of the industrial dental clinics, and one in particular interested me. It was one of the two dispensaries maintained by the London Omnibus Employees Association; there are thirty-five thousand members in the society. Three dentists, four nurses, and four mechanics were employed there whose hours of labor and compensation were fixed by the association. The only service rendered was the necessary prophylaxis, the extracting of teeth and making of plates. The volume of work to be done and the limited means at the disposal of most English workmen necessitate that form of service which will render the greatest amount of restorative service for the least expenditure of money.

I found generally on the Continent that, because of the compulsory insurance system, the largest percentage of the people pay little or no attention to the prevention of disease or to keeping well because they know the contributory plan makes it possible for them to go to the clinic or the hospital for service whenever they are sick. Ninety per cent of the people of Germany go to public clinics for their dental service. I visited forty dental schools and equally as many community, school and industrial dental clinics in western Europe, and in nearly all of the countries which I visited little effort is being made to maintain health and efficiency by keeping well.

The industrial dental dispensary has a very definite value in any plant where there is a sufficient number of employees (three hundred or more) to justify health service. The returns justify the expenditure made both as to time saved and good will earned.

The service in dentistry is quite satisfactory if conducted on a part-time basis, if, in the selection of the dentist or the staff, care is taken to choose persons who are capable and *interested* and who will remain long enough to establish and maintain a procedure that will be satisfactory to employer, employee, and associates alike.

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PRINCIPLES WHICH GOVERN REFLEX ACTION IN DISEASE*

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DISCUSSION *by Samuel D. Ingham, M. D., Los Angeles; Lewis Gunther, M. D., San Francisco.*

AN understanding of the principles of the visceral reflex is essential to the understanding of disease, yet no effort commensurate with its importance is made to understand the subject. Certain reflexes arising and ending in the voluntary structures are described in all textbooks, but the visceral reflexes receive very little discussion except in the writings of physiologists.

Disease expresses itself in symptoms. Symptoms are disturbances of normal physiology. A disease can rarely be suspected by the one affected until it begins to produce changes in physiologic action, such as discomfort, pain, or a disturbance in function of some organ, as the eye, heart, lungs, stomach, intestines, liver or kidney.

In order to understand the part played by the reflex in disease it is necessary to understand to what processes activity in the body is due. Activity of cells is automatic. In the viscera it exists independently of nerves and hormones, and takes place normally as long as their protein and lipoid masses are bathed in the physiologic salt-containing body fluids.

The hormones or chemical messengers are not for the purpose of causing action but of altering

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